The climate of the region is mild and moderately moist. The mean annual temperature is about 15.5 °C, and mean annual precipitation is about 52 in. (Hardy and Hardy, 1971). Variability in annual precipitation totals is large, ranging from 35 to 80 in., but average monthly precipitation is relatively uniform throughout the year, with slightly higher amounts typically occurring during the late summer months of July, August, and September. Evapotranspiration rates average about 34 in/yr (inches per year) and exhibit much less variability from year to year than precipitation (Wilder and others, 1978). Average wind speeds are about 10 mi/hr (miles per hour). Winds typically blow from south to southwest between April and August, and from north to northwest between September and February; there is no prevailing wind direction during March (Garrett and Bales, 1991).

Hyde County Basins

The three Hyde County study basins, located near the community of Rose Bay, are drained by adjacent, parallel drainage canals (fig. 2). The data-collection sites are all less than 2,000 ft from the confluence of the drainage canals with Rose Bay Creek, a tidal creek draining to Rose Bay. The basins range in size from 70 to 140 acres (table 1) and are characterized by highly productive mineral soils, which are used to grow winter wheat and soybeans in rotation (R. Woolard, U.S. Soil Conservation Service, oral commun., 1988). All runoff within each basin is by way of surface drainage to ditches and subsequently to the canals in which the data-collection installations are located. The canals at sites H2 and H3 are about 13 ft wide at the top and about 4 ft deep. The drainage canal at site H1 is about 9 ft wide and 2 ft deep but was not as well maintained as at sites H2 and H3.

Data were collected downstream from tide gates at sites H1, H2, and H3 to determine nutrient and sediment concentrations and to quantify the effects of tide gates on downstream receiving-water quality. In July 1988, a tide gate was placed in the canal about 100 ft upstream of site H1. The tide gate was installed by the landowner, with assistance from the Hyde County Soil and Water Conservation District. Following more than 2 years of data collection at sites H1, H1A, H2 and H3, tide gates were installed in the canals upstream of sites H2 and H3 in August 1990. Gages were then installed at sites H2A and H3A (fig. 2) about 15 ft upstream of the tide gates to record water levels at 15-minute intervals. Specific conductance was also measured biweekly upstream of the tide gates at sites H1A, H2A, and H3A. Data were collected for about 2 additional years at all six sites.

Beaufort County Basins

The two Beaufort County agricultural basins are located near the community of Campbell Creek, 5 mi east of Aurora (fig. 3) and about 20 mi southwest of the Hyde County basins. The basins are similar in size to the Hyde County basins (table 1). Soils within the basins are loams and fine sandy loams. The basins are used exclusively for row crops (corn, milo, soybeans, potatoes, and winter wheat). All runoff within each basin is by way of surface drainage, but there is a more extensive network of surface-drainage ditches in the Beaufort County basins than in the Hyde County basins (fig. 2).

Initially, data were collected in an agricultural drainage canal (site B1) that drains into Bond Creek (fig. 3). The support structure for flashboard risers was installed in the canal